United States District Court
EASTERN DISTRICT OF TEXAS
SHERMAN DIVISION

IMPERIUM (IP) HOLDINGS, INC.	§	
v.	§	Case No. 4:11-CV-163
	§	Judge Clark/Judge Mazzant
APPLE, INC. et. al.	§	

MEMORANDUM ADOPTING REPORT AND RECOMMENDATION OF UNITED STATES MAGISTRATE JUDGE ON CLAIM CONSTRUCTION

Came on for consideration the reports of the United States Magistrate Judge in this action concerning claim construction, this matter having been heretofore referred to the United States Magistrate Judge pursuant to 28 U.S.C. § 636. On July 2, 2012, the report and recommendation of the United States Magistrate Judge was entered containing proposed findings and recommendations regarding claim construction [Doc. #209].

In this patent infringement suit, Plaintiff asserts United States Patent Nos. 6,271,884 (the "'884 Patent"), 6,838,651 (the "'651 Patent"), 6,838,715 (the "'715 Patent"), 7,064,768 (the "'768 Patent"), and 7,109,535 (the "'535 Patent"), which all relate to digital cameras and camcorders and the sensor arrays used therein. Having received the recommendation of the United States Magistrate Judge [Docs. #209], having considered the objections and responses thereto filed by Plaintiff and Defendants [Docs. #220, #221, #239, #240, #246], and having conducted a *de novo* review of the objections in relation to the pleadings and applicable law, this court is of the opinion that the findings and conclusions of the Magistrate Judge are correct, subject to the modification of the construction of the "[green/red] zone system" terms in Section

B.2, herein. The court otherwise adopts the Magistrate Judge's reports as the findings and conclusions of the court.

DISCUSSION

A. Plaintiff's Objections to Claim Construction [Doc. #221]

1. '884 Patent

a. Overall system gain - As to the disputed term "overall system gain," Plaintiff argues that the Magistrate Judge improperly relied on the meaning of "gain" instead of the disclosure in the specification that uses the term "overall system gain" in relation to brightness [Doc. #221 at 3]. Plaintiff submits that "brightness" is a property of the system, not just of the image. *Id.* at 6. Defendants respond that Plaintiff does not dispute that "gain" is a well-known engineering term with an established meaning [Doc. #240 at 1]. Defendants assert that in order for a party to demonstrate that the patentee departed from the ordinary meaning, and acted as its own lexicographer, "a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning." *Id.* at 2-3 (citing *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Finally, Defendant contends that the references to "brightness" in the specification are consistent with, and support, the recommendation of the Magistrate Judge. *Id.* at 4.

Plaintiff's objections merely re-hash the arguments it made at the claim construction hearing. In short, Plaintiff asserts that "overall system gain" appears only once in the specification, citing '846 Patent, at 5:49-6:9. Plaintiff asserts that this section that refers only to variable brightness control and automatic brightness control, so "overall system gain" must refer to "brightness."

This argument ignores the fact that the cited lines merely repeat an earlier description of the embodiment as having "three gain levels of integration time, the eight levels of analog gain, and the multiple levels of digital gamma correction . . . ." (Compare passage cited by Plaintiff - '866 Patent at 6:1-3 with '866 Patent at 5: 52-67). In the absence of a particular definition provided by the patentee, normal English syntax and grammar leads to the conclusion that "overall system gain" simply refers to the gain from all three sources. In the context of this invention, increasing gain, everything else being equal, should increase brightness of the display. But this cause and effect relationship does not mean that either "gain" or "overall system gain" is a synonym for "brightness" to one of skill in the art.

The report properly addressed Plaintiff's arguments regarding "overall system gain" [Doc. #209 at 9-12]. Plaintiff's objections as to the term "overall system gain" are overruled.

> **"overall system gain"** means **"the ratio of the output signal of the entire system to the input signal to entire system."**

b. Adjusting the overall system gain by adjusting the integration time - this term occurs in the step listed third in Claim 1, a method claim, set out below with the term italicized:

> **1.** A method of reducing flicker caused by lighting having a periodic intensity using an imager having a pixel integration time, the method comprising the steps of:
> setting the integration time to an integral multiple of the period of the periodic intensity of the lighting;
> determining an amount to vary an overall system gain; and
> *adjusting the overall system gain by adjusting the integration time* while maintaining the integration time at an integral multiple of the period of the periodic intensity.

The recommended construction is "adjusting the overall system gain by the determined amount by adjusting the integration time." This construction was based in part on the observation that the step listed second in the claim is "determining an amount to vary an overall system gain." Defendants had argued, and the Magistrate Judge agreed over Plaintiff's strenuous

objections, that there would have to be a determination of what variance in system gain was desired before adjustments would be made.

Plaintiff now objects that the Magistrate Judge improperly imported "by the determined amount" into the term [Doc. #221 at 7]. Plaintiff argues that the steps of the claim could be performed in any order. This seems akin to the theory that enough monkeys with typewriters may eventually reproduce one of Shakespeare's sonnets. But one of skill in the art would know that the claim does not teach a method of random adjustments to the integration time. As set out in the second step, some determination is made of the variation of the overall system gain. Then, as described in the third step, one or more adjustments would be made. This is not to say that these steps could not be repeated a number of times in an effort to achieve better and better results.

Nevertheless this court must respectfully disagree with the final construction of the Report and Recommendation. Intrinsic evidence does not support limiting the adjustment described in the third step to exactly what was determined in the second step. Plaintiff correctly points out that "adjusting the integration time" is a "coarse" adjustment, since the integration time must be maintained as an integral multiple of the period of the periodic intensity. *See* '884 Patent 5:52-54, *see also* '884 Patent 1:29-31; 1:60-64.

In the preferred embodiment, integration time can be set at 10, 20, and 30 milliseconds, each of which is a multiple of the 10 millisecond period of peak intensity of 50Hz lighting. '884 Patent 5:55-57. Finer resolution enhancement is provided by an amplifier **308** with eight levels of amplification, and a color and gamma correction block **314** that provides many levels of correction. '884 Patent 5: 60 – 6:4. The third step of Claim 1 describes the "coarse" adjustment achieved by adjusting the integration time to a multiple of the period of peak intensity. This does

not mean that this coarse adjustment must exactly equal the "amount to vary" that was determined in the second step of the claim. One could logically use the coarse adjustment feature to get as close as possible, and then make finer adjustments with the amplifier or the color and gamma correction block. And, there is no reason to say that Claim 1 could not read on a method that used only the coarse adjustment of adjusting the integration time, even if such a method is at a competitive disadvantage with more sophisticated systems that allow further fine adjustments.

The parties have no real dispute over the word "adjusting." The court has already construed "overall system gain." The parties raised no argument about the meaning of "integration time," which is well described in the specification. '884 Patent 1:47-50. Plaintiff's objection is sustained and the court construes this term as follows:

"adjusting the overall system gain by adjusting the integration time" means **"adjusting the overall system gain by an amount as close to the determined amount as can be accomplished by adjusting the integration time"**

2. '651 Patent

Plaintiff argues that the report's construction of "for converting the output . . ." to mean "for converting the same output . . ." could mislead the jury to believe that the output cannot be processed before being converted [Doc. #221 at 10]. Any argument along these lines, however, would be barred by the report's analysis, which states that the construction is not so limited:

> To be clear, the Court's construction does not exclude processing of the "output" prior to the recited "converting." Any argument to the contrary by Defendants is hereby expressly rejected.

[Doc. #209 at 20]. Plaintiff submits that these comments of the Magistrate Judge are not part of the actual construction and that a finding that "no construction is necessary" would be preferable to the potentially misleading construction recommended by the Magistrate Judge [Doc. #221 at 10].

If Defendants attempt to present arguments that are inconsistent with the court's claim construction analysis, the issue can be addressed through motions to strike expert testimony, motions in limine, and objections during trial. The analysis and construction of the Magistrate Judge is appropriate and is adopted without modification. Plaintiff's objections as to these terms are overruled.

3. '715 Patent

As to the "approximately aligns" limitations, Plaintiff re-urges that the "redirected ray" is "a portion of the 'principal ray'" [Doc. #221 at 11]. Defendants argue that Plaintiff's contention that the redirected rays are the same as the identified principal rays "flies in the face of elementary geometry and the patent specification" [Doc. #240 at 10]. Defendants contend that because the principal ray and the redirected ray form different angles, both rays cannot make up the claimed principal ray angle. *Id*.

Although the specification refers to "redirected rays 372 . . . of principal ray 370" ['715 Patent at 9:56], the Magistrate Judge properly found that the best reading of the specification is that the redirected rays are derived from the principal ray, not that the redirected rays are part of the principal ray [*See* Doc. #209 at 23-28]. Plaintiff also argues that in the phrase "principal ray angle incident said second pixel," the word "pixel" refers to the photodiode, not the pixel as a whole [Doc. #221 at 12]. The report properly explains, however, that the term "pixel" is used to refer to the entire pixel structure, including, where present, the microlens [Doc. #209 at 26].

This conclusion is reinforced by the report's analysis of Claim 11, which recites "a principal ray angle incident a *photodetector* of said second pixel" rather than "incident" a "pixel," as recited in the other claims at issue [Doc. #209 at 28-29].

In sum, Plaintiff's arguments have been properly addressed by the report of the Magistrate Judge. Plaintiff's objections as to the "approximately aligns" limitations are therefore overruled.

4. '535 Patent

Regarding the report's rejection of Plaintiff's proposed "during ion implantation" limitation as to the term "wherein the isolation surface is not covered by an insulating film," Plaintiff submits the parties were not fully heard on the issue because the Magistrate Judge stated during the May 31, 2012 hearing that the issue could be addressed later in the case [Doc. #221 at 15; *see* Doc. #202, 5/31/2012 TR at 185-187].

Defendants contend that the Magistrate Judge followed the exact mandate required by the Federal Circuit in *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) [Doc. #240 at 12]. Defendants argue that the Magistrate Judge properly resolved a claim construction dispute, as was its duty to do so. *Id*. at 14.

On balance, the issue was properly addressed by the Magistrate Judge as part of claim construction, and Plaintiff was adequately heard because the parties fully briefed the issue. Also, the Magistrate Judge gave Plaintiff an opportunity at the hearing to respond to Defendants' *O2 Micro* challenge (that it is the court's duty to resolve claim construction disputes). *See O2 Micro*, 521 F.3d at 1362 ("When the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it."). Plaintiff argued that the issue would be a

factual dispute to be resolved through expert testimony [*See* Doc. #202, 5/31/2012 TR at 185:16-186:23]. The court was thus fully apprised of the parties' positions.

The report's recommendation of no construction for this term reflects the agreement of the parties and the court at the hearing that no construction is necessary [Doc. #209 at 44-45]. Evidently, for the sake of efficiency and to avoid confusion later in the case, *O2 Micro* compelled the Magistrate Judge to resolve the "during ion implantation" dispute that was fully briefed and that was highlighted at the hearing. The court adopts the report's reasoning and conclusion that Plaintiff's proposed "during ion implantation" limitation be rejected. Plaintiff's objection in this regard is therefore overruled.

B. Defendants' Objections to Claim Construction [Doc. #220]

1. '715 Patent

As to the "approximately aligns" limitations, Defendants object that the reference in the recommended constructions to "creating an optical path at the same angle" is unsupported [Doc. #220 at 2]. Defendants urge that because the claims recite aligning pixel elements with the principal ray angle, the Magistrate Judge has impermissibly rewritten the claims. *Id.* at 3. Plaintiff asserts that the construction of the Magistrate Judge provides clarification as to what "align" means with respect to the various pixel elements [Doc. #239 at 2]. In addition, Plaintiff argues that the construction is supported by the specification, and that Defendants failed to propose a construction for the portion of the term to which they now object. *Id*. at 2-3.

In reply, Defendants argue that during claim construction, and as recognized by the report and recommendation, Defendants took the position that only "principal ray angle" required construction [Doc. #246 at 1]. Defendants argue that the ordinary meaning of the remaining language should have been adopted. *Id*. at 2. It is all very well for a party at the claim

construction hearing to assert "ordinary meaning." But when no definition of that ordinary meaning is provided, let alone an agreement with the opponent, it is the court's experience that the issue will be raised at trial, usually through an expert opining to the jury that "thus and so is just the ordinary meaning."

Having considered the objection, the response, the reply, the report, and the relevant evidence, this court finds that the reference to "an optical path" in the recommended construction is proper and supported, as discussed herein.

Claim 1 is representative and recites (emphasis added):

> 1. A CMOS image sensor comprising:
> a plurality of pixels arranged in an array;
> said plurality of pixels including a first pixel proximate an optical center of said array, and a second pixel proximate a peripheral edge of said array;
> a first metal interconnect segment associated with said first pixel; and
> a second metal interconnect segment associated with said second pixel,
> wherein said first metal interconnect segment and second metal interconnect segment are situated in a first metal layer,
> wherein said second metal interconnect segment is shifted closer to said optical center than said first metal interconnect segment so that said second metal interconnect segment *approximately aligns with a principal ray angle incident said second pixel*.

The report construed both "approximately aligns with a principal ray angle incident said second pixel" in Claim 1 and "approximately aligns with said principal ray striking said second pixel" in Claim 5 to mean "situated so as to create an optical path at approximately the same angle as the average ray striking the first pixel element of the second pixel" [Doc. #209 at 28].

Similarly, the report construed "approximately aligns with said princip[al] ray angle incident said first pixel" in Claim 15 to mean "situated so as to create an optical path at approximately the same angle as the average ray striking the first pixel element of the first pixel." *Id.*

Aside from their summary judgment motion arguing that the term "approximately" renders the claims indefinite, which is addressed in Section D, below, neither Defendants' claim construction briefing nor Defendants' objections to the report propose any construction of "approximately aligns" [*See* Doc. #183 at 14-16; Doc. #220 at 1-4].

Plaintiff's request for construction is proper because the claim language does not, on its face, explain how "said second metal interconnect segment," in isolation, can "align[] with a principal ray angle." Reading Claim 1, for example, as a whole, a person of ordinary skill in the art would consider the relationship between the second metal interconnect segment and the first metal interconnect segment. Defendants themselves cite disclosure in the specification that multiple structures are shifted with respect to an "optical center axis" so as to "align with principal ray" [Doc. #220 at 2 (citing '715 Patent at 9:59-62)]. Indeed, the full sentence cited by Defendants discloses:

> Due to the particular arrangement of CMOS imaging array 300, redirected rays 372 and 376 of principal ray 370 and ray bundle 374 strike photodetector 322 but are *not blocked* by metal interconnect segment 326, 328 and 330 because each of metal interconnect segments 326, 328 and 330, color filter 332, and micro lens 334 have been *shifted toward optical center axis 336 to approximately align with principle ray 370,* as described above.

['715 Patent at 9:55-62 (emphasis added)]. The specification thus discloses that alignment is a result of pixel elements being "shifted" so that light is "not blocked." *Id.*

Similarly, the Summary of the Invention discloses that "the shifts of the metal interconnect segments and pixel elements approximately align to the principle ray angle" so as to reduce "pixel light shadowing" ['715 Patent at 2:56-60]. The Background of the Invention explains that pixel elements cause "pixel light shadowing" by blocking incoming light:

> Pixel light shadowing is caused when the average ray or principal ray striking the pixel deviates significantly from normal (or perpendicular to the imaging array

> plane). Under these conditions, one or more of the pixel elements situated over the photodetector may block a significant amount of light from being directed at the photodetector. As a result, the brightness of the resulting image is significantly reduced, resulting in poor image quality. Moreover, the pixels situated at the periphery of the imaging array are significantly more susceptible to pixel light shadowing. As a result, the resulting images have significant and undesirable brightness falls off at the edges of the field of view.

['715 Patent at 2:5-17].

Thus, in Claim 1 for example, the second metal interconnect segment is shifted so as to create an optical path at approximately the same angle as the principal ray angle. The above-cited portion of the Summary of the Invention and the following passage support such a reading:

> Proximate the optical center where the principle ray angle is aligned substantially perpendicular to the wafer, the metal interconnect segments are all aligned above the transistor and isolation regions of the pixel leaving the photodiode unobscured to collecting light. In comparison, proximate the corners of the array or proximate the periphery of the array, the metal interconnect segments associated with those pixels are shifted so as to appear to be "tilted" towards the optical center of the array to thereby *align the light collection path with the principle ray angle* incident the respective pixels. Such tilts can be typically in the range of 15 to 25 degrees for certain lenses.

['715 Patent at 2:60-3:5 (emphasis added)]. This disclosure, especially the disclosure of "align[ing] the light collection path with the principle ray angle incident the respective pixels," supports the reference to an "optical path" in the report's construction of the "approximately aligns" terms. *Id.* at 3:2-3.

Defendants' objections as to the "approximately aligns" terms are overruled.

As to the construction of "metal interconnect segment," Defendants object that the lexicography cited by the report actually refers to a specific set of "four wires" in each pixel, not just any "wire" as found by the report [Doc. #220 at 5]. Defendants also argue that the court's construction ignores the word "interconnect," which Defendants submit refers to sending and receiving signals. *Id.* at 6.

In response, Plaintiff contends that adopting Defendants construction would improperly import limitations from an exemplary embodiment in the specification into the claims [Doc. #239 at 4]. Defendants argue that their construction explicitly includes the function of resetting the pixel, and does not exclude this function as Plaintiff suggests [Doc. #246 at 2]. Further, Defendants contend that Plaintiff's argument that the term "metal interconnect segment" should not be limited to four wires is irrelevant, since Defendants' proposed construction does not attempt to limit the number of structures. *Id*.

Defendants' proposal is too limited in light of the patentee's lexicography, which states:

> In a typical three-transistor active pixel design for a CMOS image sensor, each pixel includes *four wires (or "metal interconnect lines" or "metal interconnect segments")* and three transistors, namely, a reset transistor, a source-follower transistor, and a select transistor. Two metal interconnect segments are disposed horizontally to provide row selection for either resetting the pixel or reading the pixel. Two other metal interconnect segments are disposed vertically (or substantially perpendicular to the first two metal interconnect segments) to provide column selection for both reading and resetting the pixel.

['715 Patent at 1:55-65 (emphasis added)]. The report properly interpreted this passage as defining "metal interconnect segment" to mean "wire" [Doc. #209 at 33]. Further, Defendants have not adequately demonstrated that the constituent term "interconnect" warrants limiting the term to a structure for sending and receiving signals. In sum, the report's reliance on the lexicography is proper in light of the general rule that the patentee's lexicography governs. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) ("[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs.").

Defendants' objections as to the term "metal interconnect segment" are therefore overruled.

2. '768 Patent

The disputed terms "green zone system" and "red zone system" appear in Claim 15 and Claim 16, respectively (emphasis added):

> 15. A system for detecting a bad pixel comprising:
> a minimum characteristic system determining minimum characteristic data for a plurality of adjacent pixels;
> a maximum characteristic system determining maximum characteristic data for the plurality of adjacent pixels; and
> a pixel testing system receiving test pixel data, the minimum characteristic data and the maximum characteristic data and generating test result data as a function of whether the test pixel data is less than the minimum characteristic data or greater than the maximum characteristic data; and
> *a green zone system receiving the test pixel data and selecting the set of adjacent pixels based on a green pixel distribution of a Bayer pattern.*
>
> 16. A system for detecting a bad pixel comprising:
> a minimum characteristic system determining minimum characteristic data for a plurality of adjacent pixels;
> a maximum characteristic system determining maximum characteristic data for the plurality of adjacent pixels; and
> a pixel testing system receiving test pixel data, the minimum characteristic data and the maximum characteristic data and generating test result data as a function of whether the test pixel data is less than the minimum characteristic data or greater than the maximum characteristic data; and
> *a red zone system receiving the test pixel data and selecting the set of adjacent pixels based on a red pixel distribution of a Bayer pattern.*

The report jointly construed the terms "green zone system" and "red zone system" in accordance with Plaintiff's proposed construction [Doc. #209 at 39]:

> [T]he Court hereby construes **"a [green/red] zone system receiving the test pixel data and selecting the set of adjacent pixels based on a [green/red] pixel distribution of a Bayer pattern"** to mean **"system that receives the test pixel data and selects pixels of the same color as the test pixel within a zone of pixels surrounding the test pixel based on a Bayer pattern pixel distribution."**

Defendants object that the Magistrate Judge erred because the recommended construction does not specify the color of the selected pixels [Doc. #220 at 8]. For example, Defendants

argue that if the test pixel is blue, then the report's construction would require both the green zone system and the red zone system to select blue pixels. *Id.* Defendants also re-urge their arguments that the specification discloses different characteristics that may be tested and that "adjacent pixels selected for testing each type of characteristic will necessarily be pixels that are part of different zones." *Id.* at 9. Defendants further note that "Claims 15 and 16 do not even specify the color of the test pixel," and Defendants conclude that the selected pixels need not be the same color as the test pixel. *Id.* at 12.

Plaintiff argues that the Magistrate Judge's construction is consistent with the language of the claims and specification, and correctly prevents the importation of unclaimed limitations [Doc. #239 at 8]. In reply, Defendants argue that the construction imports extraneous limitations into the claims by reading the term "test pixel" into the claims [Doc. #246 at 4]. Defendants assert that the construction read out the limitation as a whole, since a "green" or "red zone system" is not a term of art and has no plain and ordinary meaning outside the '768 patent specification. *Id.*

The specification discloses:

> The set of adjacent pixels can be selected by color zone system 112 non-color zone system 118, or other suitable systems. In this exemplary embodiment, *color zone system 112 can select a set of adjacent pixels based on the color of the test pixel, on the pixel color distribution pattern type (such as a Bayer pattern), or other suitable data.* Likewise, non-color zone system can select a set of adjacent pixels based on the proximity of the adjacent pixels to the test pixel, regardless of color. Other suitable processes can be used to select a set of adjacent pixels from which to select the maximum and minimum characteristic value.

['768 Patent at 4:21-32 (emphasis added)]. Defendants interpret this passage and the claim language to mean that the "green zone system," for example, selects green pixels based on the Bayer pattern distribution and can do so for a test pixel of any color [*See* Doc. #220 at 12].

Plaintiff, by contrast, has urged that the "green zone system" selects green pixels only for green test pixels. The report correctly interpreted the claim language and the above-quoted passage from the specification, properly rejected Defendants' arguments, and appropriately found that the "green zone system" and "red zone system" select pixels of the same color as the test pixel [Doc #209 at 37-38].

To clarify that the green zone system is used with green test pixels and the red zone system is used with red test pixels, the construction is modified as follows:

"green zone system" means **"system that receives the test pixel data from a green pixel and selects green pixels within a zone of pixels surrounding the test pixel based on a Bayer pattern pixel distribution."**

"red zone system" means **"system that receives the test pixel data from a red pixel and selects red pixels within a zone of pixels surrounding the test pixel based on a Bayer pattern pixel distribution."**

"system" as used in these definitions means **"hardware, software, or a combination thereof.**

Defendants' objections are otherwise hereby overruled.

CONCLUSION

For the foregoing reasons, it is hereby **ORDERED** that the Report and Recommendation of United States Magistrate Judge regarding claim construction [Doc. #209] is hereby adopted, and the objections of Plaintiff and Defendants **OVERRULED**, subject to the modification of the constructions of "adjusting the overall system gain by adjusting the integration time" and the "[green/red] zone system" terms in Section B.2, above.

So **ORDERED** and **SIGNED** this **28** day of **January, 2013.**

Ron Clark, United States District Judge